CHEMICAL HERITAGE FOUNDATION

STEPHEN M. DENNING

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

Marcia L. Meldrum

at

Duke University Medical Center
Durham, NC

on

23-25 August 1995

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of Pew Biomedical Scholar Advisory Committee members.

From the original collection at the Center for Oral History Research, UCLA Library, UCLA.

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REFORMATTING:

Marnie Berkowitz, Consultant to the Chemical Heritage Foundation. B.A., Classical Languages and Literatures, University of Minnesota; Ford Foundation Fellowship, Classical Languages and Literatures, University of Chicago.

David J. Caruso, Program Manager, Biomedical Sciences and Technologies, Chemical Heritage Foundation. B.A., History of Science, Medicine, and Technology, Johns Hopkins University; PhD., Science and Technology Studies, Cornell University.

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Oral History Interview Agreement No. R950830

This Interview Agreement is made and entered into this 19th day of March, 1996 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and STEPHEN M. DENNING having an address at Duke University Medical Center, Department of Medicine, Box 31203, Durham, North Carolina, 27710, called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about August 23, 1995, and tentatively entitled "Interview with Stephen M. Denning". This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes, hereinafter collectively called "the Work."

In consideration of the mutual covenants, conditions, and terms set forth below, the parties hereto hereby agree as follows:

1. Interviewee irrevocably assigns to University all his copyright, title and interest in and to the Work. This assignment applies to University, its successors, and assigns, for and during the existence of the copyright and all renewals and extensions thereof.

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3. Interviewee acknowledges that he will receive no remuneration or compensation for his participation in the interviews or for the rights assigned hereunder.

4. Interviewee will receive from University, free of charge, one bound copy of the typewritten manuscript of the interviews.

5. To insure against substantive error or misquotation, Interviewee will have the right to review the manuscript before it is put into final form. University therefore will send Interviewee a copy of the edited transcript for review and comment. Interviewee will return transcript and comments to University within 30 days of receipt of the transcript. In the event that Interviewee does not respond within 30 days, University will assume that Interviewee has given full approval of the transcript.

6. All notices and other official correspondence concerning this Agreement will be sent to the following:

If to University:

Office of Research Administration
University of California, Los Angeles
P.O. Box 951406
Los Angeles, California 90095-1406

Attention: Ms. Carli V. Rogers
Copyright Officer

If to Interviewee:

Stephen M. Denning
Duke University Medical Center
Department of Medicine
Box 31203
Durham, North Carolina 27710

University and Interviewee have executed this Agreement on the date first written above.

INTERVIEWEE

Stephen M. Denning
(Signature)

Stephen M. Denning
(Typed Name)

Duke University Medical Center
Department of Medicine

Box 31203
(Address)

Durham, North Carolina 27710

Date August 23, 1995

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

(Signature)

Carli V. Rogers
(Typed Name)

Copyright Officer
(Title)

(Address)

Date November 19, 1996

Pew Scholars in the Biomedical Sciences

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This constitutes my entire and complete understanding.

Stephen M. D.

Stephen M. Denning, M.D.

3/14/06

Date

Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106

STEPHEN M. DENNING

1954 Born in Murphy, North Carolina on 19 March

Education

1976 B.S., Duke University
1980 M.D., Duke University

Research Appointments

University of Chicago Hospitals and Clinics
1980-1981 Intern
1981-1983 Resident

Duke University Medical Center, Division of Cardiology
1983-1984 Clinical Fellow
1985-1987 Research Fellow

Professional Experience

Duke University, Department of Medicine
1987-1989 Assistant Professor
1989-present Associate Professor

Honors

1976 Phi Beta Kappa
1987 Clinician Scientist Award, American Heart Association
1990-1994 Pew Scholar in the Biomedical Sciences

Selected Publications

Denning, S.M. et al., 1987. Human thymic epithelial cells can function as accessory cells for autologous mature thymocyte activation. Journal of Immunology, 138:680-86.
Denning, S.M. et al., 1987. Monoclonal antibodies to CD2 and LFA-3 antigens inhibit

human thymic epithelial cell dependent mature thymocyte activation. *Journal of Immunology*, 139:2573-78.

Denning, S.M. et al., 1988. Human thymic epithelial cells directly induce autologous immature thymocyte proliferation. *Proceedings of the National Academy of Sciences USA*, 85:3125-29.

Denning, S.M. et al., 1988. Purified lymphocyte function associated antigen-3 activates human thymocytes via the CD2 pathway. *Journal of Immunology*, 141:2980-85.

Denning, S.M., and B.F. Haynes, 1988. Differentiation of human T cells. *Clinics in Laboratory Medicine*, 8:1-14.

Haynes, B.F. et al., 1989. Ontogeny of T-cell precursors: A model for the initial stages of human T-cell development. *Immunology Today*, 10:87-90.

Haynes, B.F. et al., 1989. CD44--a molecule involved in leukocyte adherence and T-cell activation. *Immunology Today*, 10:423-28.

Denning, S.M. et al., 1989. Human postnatal $CD4^-$, $CD8^-$, CD3 thymic T cell precursors differentiate in vitro into T cell receptor δ-bearing cells. *Journal of Immunology*, 142:2988-97.

Haynes, B.F. et al., 1990. Human intrathymic T cell differentiation. *Seminars in Immunology*, 2:67-77.

Denning, S.M. et al., 1990. Antibodies against CD44, p80, lymphocyte homing receptor augment human peripheral blood T cell activation. *Journal of Immunology*, 144:7.

Denning, S.M. et al., 1991. Analysis of clones derived from human $CD7^+$, $CD4^-$, $CD8^-$, CD3 - thymocytes. *International Immunology*, 3 :1015.

DeNofrio, D. et al., 1995. CD3 δ and ε gene expression in $CD3^-CD16^+$ natural killer cell clones derived from thymic precursors. *Human Immunology*, 43: 283-94.

ABSTRACT

Stephen M. Denning was born in Murphy, North Carolina, a small town in the foothills of the Appalachians, and "about as far west in North Carolina as you could go"; he grew up in nearby Rutherfordton. Both parents were teachers, and his one sibling, a younger brother, became a teacher—of biology—as well. From an early age, Denning was attracted to science; he remembers being enthralled by Sputnik and the United States' subsequent space program. Denning loved to read, especially about science. Biographies of scientists like Marie Curie and Louis Pasteur—and of course a chemistry set—encouraged his interest in chemistry and physics. He also evinced an early interest in electronics and took up photography as a hobby as well; this hobby he pursues today, when he has time. He was selected for several programs established to enrich education for gifted children, including the Governor's School in Winston-Salem, and found that in high school he tended to know more of some subjects (especially mathematics) than the teachers; but he had one outstanding teacher, for biology, who really inspired him. For fun, Denning and his family hiked and camped; Denning played touch football and built rockets. When he was in high school, on weekends and after school he worked in a hospital, where he drew blood and learned to analyze it.

Denning attended Duke University, receiving his BS in chemistry. The chemistry majors of his year formed a close-knit group, doing lab work and generally working together, unlike in the biology department, where competition was more prevalent. Denning applied to graduate schools in chemistry and to medical schools, unsure which course he wanted to pursue. An emeritus professor of chemistry, Marcus Hobbs, convinced him to go into medicine, as there would be more breakthroughs and discoveries in that field than in chemistry. Denning attended Duke Medical School; there he did research with Sheldon Pinnell on collagen antibodies; and then he did his internship and residency at University of Chicago. In Chicago he met his wife, Judith J. Johnson, a nurse in a medical intensive care unit. He then accepted a fellowship in cardiology under Joseph C. Greenfield at Duke University, where he has remained. He joined Barton Haynes' laboratory where he began research into the development of T cells in the human fetus and in immune response in general. His greatest interest is in the intersection between his clinical work and his research on molecular mechanisms and their therapeutic or interventional value. Denning continues to balance family—his wife, Judith, a nurse anesthetist now, and two young sons—and his work; to attempt to interest medical students in research; and to seek funding for ever more research.

UCLA INTERVIEW HISTORY

INTERVIEWER:

Marcia L. Meldrum, postdoctoral fellow, UCLA Department of History. B.A., University of Minnesota; M.B.A., Boston University; M.A., Ph.D., State University of New York at Stony Brook.

TIME AND SETTING OF INTERVIEW:

Place: Denning's office, Duke University Medical Center.

Dates, length of sessions: August 23, 1995 (138 minutes); August 24, 1995 (151); August 25, 1995 (86).

Total number of recorded hours: 6.25

Persons present during interview: Denning and Meldrum.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew scholars in the biomedical sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The Project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for Project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Meldrum then held a telephone pre interview conversation with Denning to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. Meldrum further reviewed the documentation in Denning's file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For technical background, Meldrum consulted Brigitte T. Huber and Ed Palmer, eds. Superantigens: A Pathogen's View of the Immune System. Plainview, New York: Cold Spring Harbor Laboratory Press, 1993; Charles Janeway and Paul Travers, Immunobiology: The Immune System in Health and Disease. New York: Garland Publishing Company, 1994; Pauline M. H. Mazumdar, ed., Immunology 1930-1980: Essays on the History of Immunology. Toronto: Wall and Thompson, 1989; and recent articles on immunology in Scientific American.

The interview is organized chronologically, beginning with Denning's childhood in rural North Carolina and continuing through his undergraduate and medical education at Duke University, his residency at the University of Chicago, and his research in immunology at Duke University Medical Center. Major topics discussed include the development of T cells and other components of the immune system, the relationship between research and clinical work, the

evolution of the immune system, and funding problems facing the scientific community.

ORIGINAL EDITING:

Kristian London, editor, edited the interview. He checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Denning reviewed the transcript. He verified proper names and made minor corrections. London prepared the table of contents, biographical summary, and interview history. Jennifer Glenn, Gold Shield intern, compiled the index.

TABLE OF CONTENTS

INDEX

M

N

P

Q

R